THE
GEOMETRICAL KEY:
OR
The Gate of Æquations Unlockt.

A New Discovery of the Constructions of all Æquations howsoever affected, not exceeding the 4th degree; *viz.* Of *Linears*, *Quadratics*, *Cubics*, and *Biquadratics*, and the finding of all their Roots as well true as negative, without the use of *Mesolabe*, and *Trisection of Angles*; without Reduction, Depression, or any other prævious preparation of Æquations, by a Circle and any (and that but one only) *Parabole*: and this by one only general Rule, than which a more simple, more perfect, more general, more easy to be understood, or more fit for practise, cannot be devised or wished for. Fortified with Demonstrations, Illustrated with Figures to each Æquation, and Exemplyfied with numeral Æquations (according to all the varieties of Cases) adapted to each Figure, for the use of young Mathematicians: a work hitherto desired.

By THOMAS BAKER, *Rector of* Bishop Nympton.

THe Treatise consists of about a Quire of Paper, the Discourse whereof (but not the *Algebraick Calculus*) is both in *Latin* and *English*, the better to promote its forreign vend; and this doth not render it above three Sheets the larger than it would have been in one of these Languages. Besides which, there is belonging to it diverse Draughts of Schemes to be engraven, and one *Folio* Draught, wherein the literal *Calculus* for setling the *Center*, and finding the *Radius* of the Circle that is to intersect the *Parabole* is expressed in readiness for all Cases.

How *Des Chartes* and all other famous *Analysts* came to miss this general Rule, and himself to fall upon it, he acquaints the Reader in the middle of his Discourse; namely, that they considered the Axe of a *Parabole* and not its Diameter: and affirms, that if it had been his or their hap to have described a Circle from any Point in *Position* given, passing through the *Vertex* of any Diameter in the *Parabole*, and had taken into consideration a certain propriety (than which none could so have suited the design) belonging to the Diameter of any *Parabole*, they could not but with greatest ease, have made a full Discovery of the Universal Rule.

Now whereas in the Title abovesaid, numeral Equations are said to be exemplified; this must be understood only as to their Construction, not as to expressing the value of their Roots in Numbers, about which the Author in a Letter of 24th *April* last, to Mr. *Collins* saith, that he very well knows when a *Biquadratic* is composed of two *Quadratics*; and hath divers ways to find their Roots in numbers, without seperating them: but he makes not these things his study, in regard he dares undertake to find in numbers all the Roots of any *Cubick* or *Biquadratic* howsoever affected, by aid of his Geometrical Constructions, as soon as any one can by any other way whatsoever: the which he is willing to impart.

Possibly these words may want some Explication, which are added out of a Letter long since communicated by the Learned Mr. *Isaac Newton*, Professor of Mathematics in *Cambridge*, to the aforesaid Mr. *Collins*. Namely, that when a root of any Æquation is by any method so near found, that it doth not differ above a tenth part of its self from the true root sought, the residue of the root inquired will be easily calculated by aid of some terms or Fractional parts of an infinite Series or rank of continual Proportionals, derived from the difference between the Resolvend of the known part of the Root, and that whose Root is sought. By which means by raising Resolvends

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out of any aſſumed Roots with an eaſy approach, without raiſing the reſpective powers of the ſaid Roots, we are delivered from the moſt toilſom Drudgery of Mathematical Calculations, by finding the Roots of Æquations in Numbers, by *Vietas* general method; a thing utterly unknown to the Ancients. However this is not ſaid to diſparage that Method which *Vieta* ſo greatly eſteemed, that when he had obtained it, he gave *Algebra* this high *Encomium*, that it did *Nullum non Problema ſolvere*, in his numerical Method Mr. *Oughtred* and *Harriot* have taken commendable pains. But now laſt of all, to perform it in Species as Mr. *Iſaac Newton* hath done, ſeems a new Invention never to be ſufficiently praiſed; for out of an Æquation of five Dimenſions, ſuppoſing all the terms extant and affirmed, he hath given a Series for the Root in Species, and ſuch a one as ſhall ſerve for finding the Roots of all Æquations of 3, 4 or 5 Dimenſions, by only altering the ſigns according as the Æquation is affected, and expunging ſuch parts as relate to Deficient terms in an incompleat Æquation propoſed.

Now that this admirable Doctrine may come to light, and the Learned Author (who hath many other Treatiſes worthy publick view) may be incited to impart the ſame, encouragements for the promoting thereof (ſeeing Undertakers are not to be had without) muſt be propounded.

It is therefore humbly offered, that the Royal Society by their Treaſurer *&c.* enter into Bond to ſuch Bookſeller as ſhall be the Undertaker, to take of 60 of theſe Books in Quires at 1½ *d.* each Sheet, and as much each Plate, as ſoon as printed.

The Treatiſe it ſelf and the Propoſal, is approved and agreed to by the Council of the Royal Society.

And in regard ſuch a Subſcription is not ſufficient to incite an Undertaker, that the reſpective Members endeavour by virtue of this Narrative to obtain as many more Subſcribers as they can procure amongſt others that are not of the Society, each of them to advance half a Crown in hand, in part of the former price: upon which encouragements, *Robert Clavel* Bookſeller at the *Peacock* in St. *Pauls-Church-Yard*, is ready to give reciprocal ſecurity for the performance according to this Propoſal.